REMARKS

Claims 1-72 are currently pending; claims 1, 38, 55, and 69 are independent. No claims are amended hereby. The following remarks are considered by applicant to overcome each of Examiner's outstanding rejections to current 1-72. An early Notice of Allowance is therefore requested.

I. ALLOWABLE SUBJECT MATTER

Applicants thank the Examiner for indicating that Claims 6, 20, 21, 37, 43, 61 and 71 contain allowable subject matter.

II. INDEPENDENT CLAIMS 1, 38, 55, AND 69

Claims 1-5, 7-11, 16-19, 22-36, 28-42, 44-48, 51-60, 62, 66-70, and 72 are rejected under 35 USC 102(b) over U.S. Patent 6,132,278 over Kang et al. ("Kang"). Claims 12-15, 49, 50, and 63-65 are rejected under 35 USC 103(a) over Kang.

As a preliminary matter, Applicants note Independent claim 69 recites

> 69. A field emission based sensing device comprising:
>
> **a plurality of nanostructures**; and,
>
> at least one sensor proximately positioned with respect to said nanostructures and being suitable for receiving field emissions from said nanostructures **based upon application of a bias across said sensor and nanostructures** and at **least partial displacement of said nanostructures** with respect to said sensor.

The rejection at page 2 of the Office Action is silent on the above-emphasized recitations, and is hence deficient. As such, the Office Action fails to make out a *prima facie* rejection under Section 102. Any subsequent Office Action, if any, must therefore be non-Final.

Independent Claim 1 requires "at least one nanostructure being suitable for emitting electrons." Independent Claims 38, 55 and 69 also requires a nanostructure. Kang, as cited by the Examiner, simply has no nanostructures.

The Office Action cites in particular Figure 24, element 24 and 30 as teaching a nanostructure suitable for emitting electrons. However, these are not **nanostructures** at all, they are **microstructures**. Elements 24 and 30 and their fabrication are described with respect to Figs 1a and 1b of Kang at col. 6, ln 31- to col 7 ln. 24.

Fabrication of Diamond Microtips using Substrate Molding

> In the novel method of this invention, diamond (polycrystalline, crystalline, amorphous, monocrystalline, diamond-like carbon) field emitter structures and emitter arrays can be fabricated by PECVD or by other diamond deposition processes on a variety of molding substrates, such as semiconductor (Si, Ge, etc.), metal, or insulator (glass, silicon dioxide, etc.). A schematic description of such a process for **fabricating an array of pyramidal diamond tipped microstructures** using <100> type silicon as a molding substrate is shown in FIGS. 1a and 1b. The fabrication process is started in step (1) by growing a **1 to 1.5 micron** silicon dioxide masking layer 5 on a silicon molding substrate 10 using conventional thermal oxidation… The top surface 12 of the molding substrate 10 is lightly polished in step (5) **with a 0.1 μm particle size diamond paste**. The molding substrate 10 is then ultrasonically cleaned in acetone, methanol, and deionized water, in step (6). In step (7), a **diamond film 20 (undoped, n-type, or p-type), 5-10 microns thick**, is deposited into the inverted pyramidal cavities 11 and on top surface 12 of the molding substrate 10, from a mixture of hydrogen and methane gas at a substrate temperature of 850° C.
>
> …This leaves, in step (9), an array of diamond emitters 25 arranged monolithically **on an integral diamond substrate 30**, with each emitter 25 having **a pyramidal shape and a sharply pointed microtip 26 that** substantially conforms to the inverted pyramidal shape of its corresponding cavity 11.
>
> …In accordance with another novel feature of this method, the diamond is deposited in two distinct sequential processing steps in order to initiate the diamond growth into the cavities 11 and the subsequent deposition of the diamond substrate

> 30. The primary purpose in using two sequential processing steps in depositing the diamond is to insure that the tip portion 26 of each emitter 25 is as sharp as possible with improved emission efficiency. To accomplish this, the first or "smooth" deposition step is designed to deposit diamond at and near the **tip 26 having a small grain size, preferably less than 2000 Angstroms in breadth**. The second or "standard" step is used to complete the deposition of diamond in the cavities and/or across the top surface 12 of the molding substrate 10 at an increased deposition rate to **form the diamond substrate 30. Consequently, the grain size of the diamond deposited in the standard deposition step will be larger**, but this will not substantially impair the performance of the emitter 25.

As can readily be seen Kang teaches microstructures, and does not at all teach or render predictable nanostructures, which by definition requires at least one dimension be nanoscale (between 0.1 and 100 nm). See, for example, the definition of nanostructure at Wikipedia:

> A nanostructure is an object of intermediate size between molecular and microscopic (micrometer-sized) structures.
>
> In describing nanostructures it is necessary to differentiate between the number of dimensions on the nanoscale. Nanotextured surfaces have one dimension on the nanoscale, i.e., only the thickness of the surface of an object is between 0.1 and 100 nm. Nanotubes have two dimensions on the nanoscale, i.e., the diameter of the tube is between 0.1 and 100 nm; its length could be much greater. Finally, spherical nanoparticles have three dimensions on the nanoscale, i.e., the particle is between 0.1 and 100 nm in each spatial dimension. The terms nanoparticles and ultrafine particles (UFP) often are used synonymously although UFP can reach into the micrometre range. The term 'nanostructure' is often used when referring to magnetic technology.

"Nanostructure" at http://en.wikipedia.org/wiki/Nanostructure.

Thus Kang as cited is wholly deficient as against the independent claims, as it fails to disclose or render predictable any nanostructure. Accordingly, independent Claims 1, 38, 55 and 69 are patentable over Kang. Applicants thereby respectfully request reconsideration and withdrawal of the rejections.

III. DEPENDENT CLAIMS

The other claims are dependent from one of the independent claims, discussed above, and are therefore believed patentable for at least the same reasons. As nothing in the prior art cited in the Office Action cures the above-identified deficiencies, we would respectfully request reconsideration and withdrawal of all the rejections.

CONCLUSION

Based upon the above remarks, Applicant respectfully requests reconsideration of this application and its early allowance. Should the Examiner feel that a telephone conference with Applicant's attorney would expedite the prosecution of this application, the Examiner is urged to contact him at the number indicated below.

Respectfully submitted,

Eugene LeDonne – Reg. No. 35,930
Brian M. McGuire – Reg. No. 55,445
FROMMER LAWRENCE & HAUG LLP
745 Fifth Avenue
New York, NY 10151
Tel.: 212.588.0800

ELD:BMM

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